

**AMENDMENTS TO THE CLAIMS**

1. (Currently amended) A gene detection system for detecting a target gene upon hybridization with a probe, said gene detection system comprising:

~~a probe immobilizing support comprising an electrode on which the probe is immobilized and an electrode substrate for supporting the electrode~~ an electrode substrate supporting an electrode comprising a probe immobilizing support;

heating and cooling means disposed in contact with ~~a location different from a surface of the probe immobilizing support~~ the electrode substrate at a location different from the electrode; and

a heat insulating member covering a circumferential surface of the electrode.

2. (Currently amended) The gene detection system according to Claim 1, wherein the heating and cooling means comprises a soaking component disposed in contact with ~~a the electrode substrate at the location different from the electrode surface opposite to the surface of the probe immobilizing support~~, and a heating and cooling element disposed in contact with the soaking component.

3. (Currently amended) The gene detection system according to Claim 2, wherein the thermal capacity of the soaking component is greater than that of ~~the electrode substrate the probe immobilizing support~~.

4. (Previously presented) The gene detection system according to Claim 2 or 3, wherein the soaking component comprises a temperature sensor for measuring a temperature of the soaking component, and

an actuation of the heating and cooling element is controlled according to the temperature measured by the temperature sensor.

5. (Previously presented) The gene detection system according to Claim 2, wherein the heating and cooling element comprises a Peltier element or a heater.

6. (Cancelled)

7. (Cancelled)

8. (Cancelled)

9. (Currently amended) The gene detection system according to Claim 1, wherein ~~the electrode is equipped, at least on the surface thereof, with at least a portion of a surface of the electrode comprising~~ gold, silver, or copper, and the electrode substrate comprises a ceramic material.

10. (Previously presented) The gene detection system according to Claim 1, wherein the electrode comprises a plurality of electrodes.

11. (Currently amended) The gene detection system according to Claim 10, wherein each of a plurality of probes is immobilized on each of the plurality of electrodes, and wherein each of the plurality of probes detects a predetermined base sequence different from each other of the plurality of another probes.

12. (Currently amended) A gene detection device, comprising: the gene detection system according to any one of Claims 1-3, 5 and 9-11, and further comprising control means for controlling actuation of the heating and cooling means.

13. (Cancelled)

14. (Cancelled)

15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Cancelled)

20. (Currently amended) A gene detection system according to Claim 1, wherein the heat insulating member comprises ~~a resin~~ polyether ether ketone or polytetrafluoroethylene.

21. (Currently amended) The gene detection system according to Claim 1, wherein the electrode is forms a pin.

22. (Currently amended) The gene detection system according to Claim 10, wherein the heating and cooling means independently controls a temperature of each of the plurality of electrodes.

23. (New) A gene detection device, comprising the gene detection system according to Claim 4, and further comprising control means for controlling actuation of the heating and cooling means.

24. (New) A gene detection system comprising:

an electrode substrate;

a cylindrical electrode projecting from the electrode substrate;

a probe-immobilizing surface of the cylindrical electrode away from the electrode substrate;

heating and cooling means disposed in contact with a surface of the electrode substrate at a location different from the cylindrical electrode; and

an insulating member substantially covering a circumferential surface of the cylindrical electrode projecting from the electrode substrate.

25. (New) The gene detection system according to claim 24, wherein the heating and cooling means comprises a soaking component disposed in contact with the surface of the electrode substrate at the location different from the cylindrical electrode, and a heating and cooling element disposed in contact with the soaking component.

26. (New) The gene detection system according to claim 25, wherein the thermal capacity of the soaking component is greater than that of the electrode substrate.

27. (New) The gene detection system according to Claim 25 or 26, wherein the soaking component comprises a temperature sensor for measuring a temperature of the soaking component, and

an actuation of the heating and cooling element is controlled according to the temperature measured by the temperature sensor.

28. (New) The gene detection system according to Claim 25, wherein the heating and cooling element comprises a Peltier element or a heater.

29. (New) The gene detection system according to Claim 24, wherein at least a portion of a surface of the cylindrical electrode comprises gold, silver, or copper, and the electrode substrate comprises a ceramic material.

30. (New) The gene detection system according to Claim 24, wherein the electrode comprises a plurality of electrodes.

31. (New) The gene detection system according to Claim 30, wherein each of a plurality of probes is immobilized on each of the plurality of electrodes, and wherein each of the plurality of probes detects a predetermined base sequence different from each other of the plurality of probes.

32. (New) A gene detection device, comprising: the gene detection system according to any one of Claims 24-26 and 28-31, and further comprising control means for controlling actuation of the heating and cooling means.

33. (New) The gene detection system according to Claim 24, wherein the heat insulating member comprises polyether ether ketone or polytetrafluoroethylene.

34. (New) The gene detection system according to Claim 24, wherein the electrode forms a pin.

35. (New) The gene detection system according to Claim 30, wherein the heating and cooling means independently controls a temperature of each of the plurality of electrodes.

36. (New) A gene detection device, comprising the gene detection system according to Claim 27, and further comprising control means for controlling actuation of the heating and cooling means.